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TELECOM*Government and Regulatory Affairs***ORIGINAL**

June 10, 1996

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William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW
Room 222
Washington, DC 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

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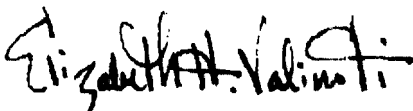
**RE: CC Docket No. 96-45. In the Matter of Federal-State Joint Board on
Universal Service**

Dear Mr. Caton:

On June 7, 1996, TDS TELECOM provided, via U.S. mail, a written presentation to Kenneth P. Moran of the Common Carrier Bureau. The presentation, prepared by TDS TELECOM's Kenneth Paker, explains the traffic sensitive nature of central office switching systems.

Pursuant to section 1.1206(a)(1) of the Commission's rules, I am submitting two copies of this notice and related attachments. Please return a date-stamped copy of the enclosed filing.

Respectfully Submitted,



Elizabeth H. Valinoti
Manager
External Relations

Attachments

cc: Kenneth P. Moran

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List ABOVE

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TELECOM

June 7, 1996

Kenneth P. Moran
Chief, Accounting & Audits Division
Common Carrier Bureau
Federal Communications Commission
2000 L Street, NW
Room 812 -- Mail Stop 1600E
Washington, DC 20554

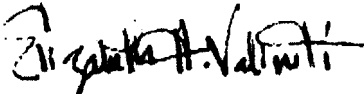
**Re: CC Docket 96-45, In the Matter of Federal-State Joint Board on
Universal Service**

Dear Mr. Moran:

Enclosed please find "Traffic Sensitivity of the Central Office Switching System," a paper prepared by TDS TELECOM's Kenneth Paker in response to your request at our March 26, 1996, meeting.

Please do not hesitate to contact Ken at 608-845-4083, or me at 608-845-4159, should you have any questions

Sincerely,



Elizabeth H. Valinoti
Manager
External Relations

Attachment

cc: Whitey Thayer
Deborah Dupont
Kenneth Paker

Traffic Sensitivity of the Central Office Switching System

TDS Telecom met with FCC Bureau Chief Kenneth Moran on March 23 to discuss the traffic sensitivity of central office switching systems. As part of this meeting, Mr. Moran made a request for more data from TDS regarding the engineering of switches for TDS. This document describes the study that was undertaken by TDS as a result of that request and provides further evidence that central office switching systems are indeed a traffic sensitive resource.

In the TDS Telecom analysis, the 5ESS-2000 switching system was used as the representative switching platform. TDS used its knowledge and experience in engineering the 5ESS-2000 switch to produce a number of priced switch configurations with varying line usage and switch size parameters. In all, twenty-five (25) separate switch engineering runs were made varying switch access line size and usage per line. Access line size refers to the number of physical lines terminated on the switching system. In the TDS analysis, we chose switch sizes of one thousand (1000), five thousand (5000), ten thousand (10,000), twenty thousand (20,000) and fifty thousand (50,000) to get a view across all typical deployments of the 5ESS-2000 switch. In the territories serviced by TDS, however, the actual switch sizes deployed range from 19 lines (not a 5ESS-2000 switch) to 16,919 with an average of 1,354 access lines per switch. (It is our understanding that the average RBOC switch size is around 11,000 access lines.) Usage per line refers to average traffic generated per line per hour measured in one hundred call seconds (CCS). Again, we picked representative usage levels to get a view across typical switch deployments. We chose 2 CCS as the lowest usage line, 4 CCS as the traditional residential line, 6 CCS as the traditional business line, 10 CCS as a high-usage business or Internet access line, and 36 CCS as a dedicated line. Each of these line usage types co-exist within the same switching system but we have made the simplifying assumption that all lines on the switch have the same usage.

The following table summarizes the TDS study. Each element of this table reflects the actual 5ESS-2000 switching system cost per line, normalized against an arbitrary point to eliminate pricing effects such as vendor volume discounts and/or decreasing electronic costs over time. In this instance, the normalization point is the 50,000 access line switch engineered at 2 CCS per line and so this point is arbitrarily set to 1.0. All other cost per line price points are given relative to this point in the table. By picking this as the normalization point, we can easily see why support mechanisms are required for companies deploying small exchanges. For example, at 2 CCS per line, the switching costs per line are 9.6 times greater for a 1000 line access switch compared to a 50,000 line access switch. Similarly, it is demonstrated that per line switching costs are 4.2 times greater for a high usage business line (10 CCS) than for a low usage residential line (2 CCS) at the 50,000 access line switch size.

Access Lines	2 CCS	4 CCS	6 CCS	10 CCS	36 CCS
1000	9.6	9.9	10.9	13.2	15.2
5000	2.6	2.8	3.1	5.8	8.0
10000	1.8	1.9	2.2	4.9	7.0
20000	1.3	1.4	1.7	4.4	6.6
50000	1.0	1.2	1.4	4.2	6.3

Table 1: Cost/Line Normalized Against Access Line Size and Line Usage

In order to more clearly show the traffic sensitive nature of switching, we have reformatted the data in Table 1. The traffic sensitive nature of switching costs is better demonstrated taking the percent change within a given access line switch size as shown in Table 2. In this table, we have normalized all per line switching costs at the 2 CCS usage level and have shown relative cost within an access line switching system size. This analysis shows, for example, that the cost per line for the high usage line (10 CCS) is 2.2 times that of the low usage (2 CCS) line at the 5000 access line switch size. It is interesting to note that the larger the switch size, the greater the sensitivity to traffic usage. However, even in the smallest switch configuration, the cost per line can vary as much as 59% depending on the usage of the lines.

Access Lines	2 CCS	4 CCS	6 CCS	10 CCS	36 CCS
1000	1.00	1.03	1.14	1.38	1.59
5000	1.00	1.07	1.18	2.20	3.03
10000	1.00	1.09	1.23	2.77	3.98
20000	1.00	1.10	1.31	3.44	5.08
50000	1.00	1.17	1.41	4.19	6.31

Table 2: Cost/Line Normalized Against Line Usage

In summary, TDS has conducted a study to provide data regarding the traffic sensitivity of central office switching resources. This data conclusively shows that a substantial portion of switching costs are indeed traffic sensitive, particularly when high usage business or Internet access lines are considered. TDS believes that support mechanisms should accurately reflect the underlying costs of the resource supported. TDS believes that combining traffic sensitive support mechanisms with non-traffic sensitive support mechanisms will result in a support mechanism which would be grossly inaccurate. We strongly urge the Commission to consider this study performed by TDS before taking action regarding any changes to existing support mechanisms.